Charles M. ICHOKU, Ph.D

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PROFESSIONAL OBJECTIVE

Having acquired valuable experience in various aspects of the Earth and atmospheric systems studies through active involvement in a variety of scientific research activities, publications, and communications, and having served in program management roles at NASA Headquarters and serving as Deputy Project Scientist for the upcoming JPSS Free-Flyer TSIS mission, it is my goal to apply the full extent of my acquired knowledge and experience in a leadership capacity. This will enable me to contribute even more effectively toward developing a better understanding of the characteristics and interactions of the critical Earth-atmosphere system components such as aerosols, clouds, and radiation and their effects on the Earth's radiative balance, environmental dynamics, and climate.

OUTLINE OF PROFESSIONAL EXPERIENCE

Current Position

Job Title : Research Physical Scientist
From : September 2008
To : Present (December 2012)
Hours per Week : 40
Employer : NASA Goddard Space Flight Center
Supervisor : Dr. Robert Cahalan (Phone : 301-614-6183)
Duties : Scientific Research, Project Scientist, and Program Management

Served at NASA Headquarters (2009-2011) in various management roles:

- Associate Program Manager for the Glory Mission. Challenged by its launch failure, I helped transition the Glory Science Team to utilize related airborne and satellite data to conduct in-depth research in order to contribute effectively toward shaping future aerosol-related missions for better understanding of aerosol impacts on climate variability and change.
- Organized and officiated at several panels that reviewed NASA ROSES proposals, leading to optimal selection of those that advance knowledge on atmospheric composition, radiation and their evolutionary processes.
- Prepared documents and other materials presented by NASA to various external agencies and other audiences, such as UN Framework Convention on Climate Change (UNFCCC) 17th Conference of the Parties (COP17), highlighting NASA's leading edge accomplishments.
- Coordinating the GEWEX Aerosol Assessment Panel (GAAP) at the request of the NASA Headquarters' responsible Program Manager. My sustained oversight has contributed to the persistence of the panel that is currently in the final stages of completing its report, which will be an excellent document providing vital objective assessment of aerosol remote sensing status to enhance climate understanding.

Within the Climate and Radiation Laboratory:

- I acted for the current Lab Chief when he was on travel, thereby practicing the day-to-day management activities required for the job, including helping resolve a potential personality conflict.
- I am Deputy Project Scientist of the upcoming JPSS Free-Flyer Total and Spectral Solar

Irradiance Sensor (TSIS) mission, helping to develop strategies to avoid gaps in solar irradiance long-term records vital for accurate climate monitoring and prediction.

- I serve as Contracting Officer Rep. (COTR), helping to provide requirements and monitor contracts that optimize productivity and save costs to NASA.
- I lead the Climate and Radiation Lab seminar series, one of the most attended Earth-science seminars here at Goddard, sharing knowledge on a diversity of topics for a comprehensive climate understanding.
- I lead the Laboratory awards committee that recognizes the accomplishments of our contractor colleagues with fairness.

In the research domain:

- I conduct research on various aspects of radiation and climate studies: measurement, remote sensing, validation, analysis and modeling of aerosols and clouds (their precursors, microphysics, dynamics, radiative properties and associated radiative forcing of the earth's energy balance), thereby helping to advance knowledge of factors responsible for regional and global climate fluctuations (e.g. *Zerefos et al*. 2009, Tellus; *Koukouli et al*., 2010, Atmos. Env.; *Levy et al*., 2010, ACP; *Peterson et al*., 2010, ACP; *Gatebe et al*., 2012, Atmos. Env.; *Ichoku et al*., 2012, Atmos. Res.).
- Principal Investigator (PI) leading a team of scientists I assembled from various organizations and fields of expertise working together to accomplish outstanding integrated research with excellent results in studying the "Interactions and feedbacks between biomass burning and water cycle dynamics in the northern Sub-Saharan Africa". As PI, I plan and conduct research, as well as train, motivate, and provide technical and scientific direction to the team. We recently submitted two papers on the project in high-impact scientific journals, with more on the way.
- I lead a team conducting coherent quantitative assessment of aerosol retrievals from multiple satellite sensors for accurate determination of aerosol three-dimensional distribution and radiative effects.
- Also, I provide advice and actively participate in various research projects conducted by other scientists and students, and serve on student Ph.D committees. One that received his Ph.D in Sep 2012 got awarded both the Naval Research Lab and NASA Postdoctoral Fellowships.

Externally, I:

- Serve on the User Working Group of Atmospheric Science Data Center (ASDC) at NASA Langley, helping to provide advise and feedback that is improving efficiency in atmospheric data services to the community.
- Served as Guest Editor for the Journal "Atmosphere" special issue on "Biomass Emissions", championing new knowledge on this important topic.
- Convened sessions at conferences, including the ISRSE and AGU, served on IGARSS program committees, and have been an invited speaker at many meetings, workshops, and conferences; successfully fostering innovative research on fire emissions to improve model parameterization, reduce uncertainty, and advance prediction capability.
- Served as one of the lead NASA PI's (2009 - 2011) that helped formulate the scientific strategy for the NASA-sponsored worldwide GLOBE Student Climate Research Campaign (SCRC), helping transfer climate research capability to the younger generation.
- Serve on the advisory committee for development of NASA’s One Stop Shopping Initiative that has simplified access to NASA’s Internship/Fellowship Opportunities.

Previous Position

Job Title : Associate Research Scientist
From : July 2006
To : August 2008
Hours per Week : 40
Employer : Earth System Science Interdisciplinary Center (ESSIC)
University of Maryland
College Park, MD 20742
Supervisor : Prof. Antonio Busalacchi (Phone : 301-405-5599)
Duties : Aerosol and Fire Remote Sensing, Research, and Scientific Applications

Aerosol remote sensing and analysis (*Remer et al*., 2008, JGR, In press); Global characterization of biomass-burning patterns using satellite measurements of Fire Radiative Energy (*Ichoku et al.*, 2008a, RSE). Regional applications of satellite estimation of smoke emissions (*Jordan et al.*, 2008, Atmos. Env.; *Henderson et al*., 2008, Atmos. Env.,). Laboratory investigation of relationships between energy release, fuel mass loss, and trace gas and aerosol emissions from biomass fires (*Freeborn et al*., 2008, JGR; *Ichoku et al.*, 2008b, JGR). Scientific re-evaluation of surface radiative effects on aerosol retrieval from satellite remote sensing (*Castanho et al*., 2007, ACP). Preparation of proposals and refereed publications related to multi-sensor aerosol and biomass-burning research and applications.

Previous Position

Job Title : Senior Scientist
From : November 1998
To : June 2006
Hours per Week : 40
Employer : Science Systems & Applications, Inc. (SSAI)
10210 Greenbelt Road, Suite 600
Lanham, MD 20706
Supervisor (Admin.) : Ms. Anita Brenner (Phone : 301-867-6272)
Supervisor (Scientific): Dr. Yoram J. Kaufman (deceased)
Duties : Aerosol and Fire Remote Sensing, Research, and Scientific Applications

Aerosol remote sensing, analysis, and evaluation of MODIS aerosol data quality (*Ichoku et al.* 2005, JGR; *Remer et al*., 2005, JAS). Scientific assessment of the effects of clouds and diurnal sampling on aerosol retrieval from satellite remote sensing (*Kaufman et al*., 2005, IEEE-TGARS). Derivation of smoke emission rates from satellite fire radiative energy measurements (*Ichoku and Kaufman*, 2005, IEEE-TGARS). Global analysis of MODIS aerosol distribution (*Ichoku et al.* 2004, ASR). Development of a methodology to match the time and space grids of MODIS and AERONET data for MODIS aerosol products validation (*Ichoku et al.* 2002, GRL; *Chu et al.* 2002, GRL; *Remer et al.* 2002). Analysis of MODIS and AERONET aerosol data and regional application over southern Africa for aerosol characterization during SAFARI-2000 (*Ichoku et al.* 2003, JGR). Analysis and calibration of Sun photometer data, evaluation of performance characteristics, and long-term aerosol measurement (*Ichoku et al.* 2003, JGR; *Sabbah et al.* 2001, JGR). Observation of fires from MODIS and AVHRR, and evaluation against fire reports (*Ichoku et al.* 2003, IJRS; *Kaufman et al.* 2003, IJRS; *Li et al.* 2001). Preparation of proposals and refereed publications related to various scientific research and applications.

Previous Position

Job Title : Research Fellow/Visiting Scientist
From : August 1997
To : October 1998
Hours per Week : 40
Employer : Biogeochemistry Department,
Max-Planck Institute for Chemistry, P. O. Box 3060
55020 Mainz, Germany
Supervisor : Prof. Maenrat O. Andreae (Phone : +49-6131-305-421)
Duties : Aerosol Measurement and Research

Radiative Transfer studies, Signal Processing. Detailed analysis of the aerosol physical, chemical, and size characteristics over the Israeli Negev desert, using ground-based and airborne in-situ measurements acquired with diverse instrumentation (nephelometer, aethalometer, passive cavity aerosol spectrometer probe (PCASP), Gent Stacked Filter Unit (SFU) aerosol sampler, small deposit area low-pressure impactor (SDI) aerosol sampler, condensation nucleus counter, and various gas analyzers). This has enabled a comprehensive assessment of the aerosol situation over the Negev during the Summer of 1996 (*Formenti et al*., 2001, JGR), Winter of 1997 (*Ichoku et al*., 1999, JGR), and on a long-term basis (*Andreae et al*., 2002, JGR).

Previous Position

Job Title : Adjunct Asst. Professor
From : August 1996
To : July 1997
Salary : Part-time Position
Hours per Week : 8
Employer : Department of Civil Engineering
Technion – Israel Institute of Technology,
Haifa, Israel.
Supervisor : Prof. Yerachmiel Doytsher (Phone : +972-4-829-3183)
Duties : Teaching of Remote Sensing, Geodetic Engineering Field methods and Computer Applications to Civil Engineering students majoring in Geodetic Engineering.

Previous Position

Job Title : Research Fellow
From : December 1993
To : July 1997
Hours per Week : 40
Employer : Jacob Blaustein Institute for Desert Research
Ben-Gurion University of the Negev
Sede Boker Campus 84990, Israel.
Supervisor : Dr. Arnon Karnieli (Phone : +972-8-659-6855)
Duties : Aerosol and Geophysical Remote Sensing and Research

Conducted continuous aerosol particle sampling with the SFU for aerosol physical and chemical analyses, and aerosol scattering measurements with the TSI-3563 three wavelength integrating nephelometer for analysis of aerosol scattering properties, over the Israeli Negev, during a period of two years (1995 – 1997). Participated actively in two intensive field campaigns (ARACHNE-96 and ARACHNE-97) involving airborne and ground-based measurements for aerosol assessment over the Negev. The acquired data have been used to establish the seasonal and long-term aerosol climatology over the Negev desert (*Andreae et al*. 2002, JGR; *Formenti et al*. 2001,

JGR; *Ichoku et al*. 1999, JGR; *Maenhaut et al*. 1996, 1997, J. Aerosol Sci.;). Conducted research on various aspects of Geosciences, Remote Sensing, and GIS using data from different sensors (Landsat, AVHRR, TOMS, ERS1-SAR, RADARSAT, SPOT) as well as digital elevation models (DEM) and other digital and analogue data types. Performed mixture modeling analyses for subpixel landcover estimation (*Ichoku et al*. 1996, RSR). Use of fractal dimensions for comparative investigation of DEM-based channel network extraction methodologies (*Ichoku et al*., 1996, WRR). Development of automated techniques for detection of drainage channel networks from digital satellite data (*Ichoku et al*., 1996, IJRS). Performed Synthetic Aperture Radar (SAR) interferometry using ERS1 (European Remote Sensing) satellite data, and combined its coherence by-product and the amplitude SAR image to accomplish detailed geologic mapping used in the neotectonic analysis of the Jordan rift valley (*Ichoku et al*. 1998, IJRS). Applied RADARSAT SAR data for neotectonic mapping of the dry floor of a major Rift Valley (*Arkin et al*. 1999, Canadian J. Rem. Sensing). Participated in arid land research (*Karnieli et al*., 2002, IJRS)

CURRENT RESEARCH GRANTS

PI: NASA ROSES-2009 NNH09ZDA001N-IDS, "Interactions and feedbacks between biomass burning and water cycle dynamics across the northern sub-Saharan African region" (PI: Charles Ichoku, Period: 2010-2013, Total funded = $1,364,000).

PI: NASA ROSES-2010 NNH10ZDA001N-ESDRERR: "Coherent uncertainty analysis of aerosol data products from multiple satellites", (PI: Charles Ichoku, Period: 2011-2015, Total funded = $927,630).

Several previous research grants.

EDUCATION

Ph.D (Docteur) in Earth Sciences (June 1993): Université Pierre & Marie Curie (UPMC), Paris, France, 1989-1993.

M. Phil (DESS) in Remote Sensing (July 1989): UPMC, Paris, France, 1988-89.

M.S. in Photogrammetry and Remote Sensing (January 1987), University of Nigeria (UNN), Nsukka, Nigeria, 1983-86

B.S. in Surveying, Geodesy & Photogrammetry (July 1982), UNN, Nigeria, 1977-82.

AWARDS

2008 : Group Achievement Award to Goddard Applied Sciences Team, NASA.
2007 : Outstanding Science Leadership Award, Lab. for Atmospheres, NASA/GSFC.
2005 : Outstanding Teamwork Award to MODIS Aerosol Team, by NASA/GSFC.
2004 : Best Paper Award, by Climate & Radiation Branch, NASA/GSFC.
2002 : Special Award for Scientific Achievement, Climate & Radiation Branch, NASA/GSFC.

RELEVANT SERVICE ACTIVITIES

- Lead coordinator of Climate & Radiation Lab Seminar Series (2012 - Present).
- Serve on the Climate & Radiation Lab. Awards Committee (2010 - Present)
- Was a reviewer for the IPCC report that won the 2007 Nobel Peace Prize.
- Chair of AEROCENTER Forum, NASA/GSFC (bi-weekly presentations and discussions on aerosol-related research by Scientists from NASA/GSFC, NOAA, Univ. of MD, and other research organizations and universities), 2005-2007.
- Member, Technical Program Committee, (i) IGARSS-2005, Seoul, Korea, (ii) ISRSE-2011, Honolulu, Hawaii.

PARTICIPATION IN FIELD CAMPAIGNS

November 2012: Combustion-Atmospheric Dynamics Research Experiments on prescribed fires (Rx-CADRE) field experiment, Eglin-AFB, FL. Ground-based and airborne measurements of prescribed fires coordinated with satellite for refined characterization.

February 2011 : Combustion-Atmospheric Dynamics Research Experiments on prescribed fires (Rx-CADRE) field experiment, Eglin-AFB, FL. Ground-based and airborne measurements of prescribed fires coordinated with satellite for refined characterization.

July 2008 : Arctic Research of the Composition of the Troposphere from Aircraft and Satellites (ARCTAS), Cold Lake, Alberta, Canada.

July 2001 : Chesapeake Lighthouse and Aircraft Measurements for Satellite (CLAMS-2001). Ground-based and aircraft measurements of surface reflectance and atmospheric data for the validation of satellite products, on/off the East Coast of the US.

March 1997 : Aerosol Radiation and Chemistry Negev Experiment (ARACHNE-97). Ground-based and aircraft measurements for the detailed study of aerosol characteristics over the Israeli Negev Desert Region during the winter.

August 1996 : Aerosol Radiation and Chemistry Negev Experiment (ARACHNE-96). Ground-based measurements for the detailed study of aerosol characteristics over the Israeli Negev Desert Region during the summer.

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Geophysical Union

COMPUTER SKILLS

- Operating Systems : Unix/Linux, WINDOWS (XP, 2000, Me, 98, …), Mac.
- Programming Languages : C, Fortran-90, Fortran-77, Perl, Unix-shell, HTML, CGI, …
- Signal/Image Processing / GIS : IDL/ENVI, ARC/INFO, ERDAS/Imagine, PCI, …
- Word Processing/Spreadsheets : Word, Excel, Powerpoint, Quattro-Pro, LaTex, …

UNDERGRADUATE HIGHLIGHT

"**Merit Award** 1979 / 1980". Special award of the Nigerian Federal Ministry of Education to university undergraduate students with excellent academic records.

OTHER RELEVANT TRAINING

March 1999: Training on Using ENVI's Hyperspectral tools and programming ENVI.

August 1990: Summer School on Image Processing and Pattern Recognition, Scottish Universities Summer School in Physics (A NATO Advanced Study Institute), University of Dundee, Dundee, United Kingdom.

1988 -1989: Lectures on the Socio-Economic Aspects of Space Studies, Conservatoire National des Arts et Metiers (CNAM), France.

1987 -1988: French Language Program, Universite de Nancy II (C.R.A.P.E.L.), France.

PRE-DOCTORAL PROFESSIONAL EXPERIENCE

1989 - 1993 : Research Assistant (Structural geology, geomorphology & remote sensing laboratory, Universite Pierre et Marie Curie, Paris, France).

1987 - 1988 : Research Trainee in Geostatistics and geologic applications of remote sensing (Centre de Recherches Petrographiques et Geochimiques, CRPG, Nancy, France).

1987- 1993 : Lecturer in Surveying Engineering and Photogrammetry (University of Nigeria, Nsukka)

1983 - 1986 : Graduate Assistant (University of Nigeria, Nsukka)

1983 : Lecturer in Mathematics, Statistics, and Surveying (Ogwashi-Uku Polytechnic, Delta State, Nigeria), from January to August 1983

1982 : Photogrammetrist (Esjay Surveys, Benin-City, Nigeria). Performed photo-interpretation for the mapping of Kano State, from August to December 1982.

1977 : Bank Employee (United Bank for Africa, Enugu, Nigeria), February to October 1977

1976 - 1977: Auxiliary Teacher (Girls' Secondary School, Ogidi, Nigeria). Teaching Mathematics and Physics to senior high school students.

DESSERTATIONS AND THESES

- "Automated Techniques for the Analysis and Recognition of Surface and Subsurface Flow Systems". (Ph.D. Dissertation, June 1993).
- "Extraction and analysis of hydrographic networks". (Thesis for DESS in Remote Sensing, July 1989).
- "Evaluation of the Zeiss C-8 Precision Coordinatograph for use as a Monocomparator". (Master's Thesis for M.Sc. in Photogrammetry and Remote Sensing, January 1987).
- "Random Error Analysis and Adjustment of a Level Network". (Degree Project Report for B.Sc. in Surveying, Geodesy, and Photogrammetry, June 1982).

PUBLICATIONS

Journal Articles (Published):

Peterson D., J. Wang, **C. Ichoku**, E. Hyer, V. Ambrosia, A sub-pixel-based calculation of fire radiative power from MODIS observations: 1 Algorithm development and initial assessment, *Remote Sens. Environ.*, 129, 262–279, 2013.

Val Martin M., R. A. Kahn, J. A. Logan, R. Paugam, M. Wooster, and **C. Ichoku**, Space-based observational constraints for 1-D fire smoke plume-rise models, *J. Geophys. Res.*, 117, D22204, doi:10.1029/2012JD018370, 2012.

Petrenko, M., **Ichoku, C.**, and Leptoukh, G.: Multi-sensor Aerosol Products Sampling System (MAPSS), *Atmos. Meas. Tech.*, **5**, 913-926, doi:10.5194/amt-5-913-2012, 2012.

Ichoku, C., R. Kahn, and M. Chin: Satellite Contributions to the Quantitative Characterization of Biomass Burning for Climate Modeling. *Atmos. Res*, doi:10.1016/j.atmosres.2012.03.007, 2012.

Gatebe, C. K., T. Varnai, R. Poudyal, **C. Ichoku**, and M. D. King: Taking the Pulse of PyroCumulus Clouds, *Atmospheric Environment* **52**, 121-130, 2012.

Henderson, S. B., **C. Ichoku**, B. J. Burkholder, M. Brauer, and P. L. Jackson, The validity and utility of MODIS data for simple estimation of area burned and aerosols emitted by wildfire events, *International Journal of Wildland Fire*, **19**, 844–852, 2010.

Peterson, D., Wang, J., **Ichoku, C.**, and Remer, L. A.: Effects of lightning and other meteorological factors on fire activity in the North American boreal forest: implications for fire weather forecasting, *Atmos. Chem. Phys.*, **10**, 6873-6888, doi:10.5194/acp-10-6873-2010, 2010.

Levy, R. C., Remer, L. A., Kleidman, R. G., Mattoo, S., **Ichoku, C.**, Kahn, R., and Eck, T. F.: Global evaluation of the Collection 5 MODIS dark-target aerosol products over land, *Atmos. Chem. Phys.*, **10**, 10399-10420, doi:10.5194/acp-10-10399-2010, 2010.

Koukouli M. E., S. Kazadzis, V. Amiridis, **C. Ichoku**, D. S. Balis, A. F. Bais, Signs of a negative trend in the MODIS aerosol optical depth over the Southern Balkans, *Atmos. Env.*, **44**, 1219–1228, 2010.

El-Askary H., R. Farouk, **C. Ichoku**, and M. Kafatos, Transport of dust and anthropogenic aerosols across Alexandria, Egypt, *Ann. Geophys.*, 27, 2869–2879, 2009.

Zerefos, C. S., K. Eleftheratos, C. Meleti, S. Kazadzis, A. Romanou, **C. Ichoku**, G. Tselioudis, and A. Bais, Solar dimming and brightening over Thessaloniki, Greece, and Beijing, China, *Tellus*, DOI: 10.1111/j.1600-0889.2009.00425.x, 2009.

Remer, L. A., R. G. Kleidman, R. C. Levy, Y. J. Kaufman, D. Tanré, S. Mattoo, J. V. Martins, **C. Ichoku**, I. Koren, H. Yu, and B. N. Holben (2008), Global aerosol climatology from the MODIS satellite sensors, J. Geophys. Res., 113, D14S07, doi:10.1029/2007JD009661.

Henderson S. B., B. Burkholder, P. L. Jackson, M. Brauer, and **C. Ichoku**, Use of MODIS products to simplify and evaluate a forest fire plume dispersion model for PM10 exposure assessment, *Atmos. Env.*, 42, 8524–8532, 2008.

Ichoku, **C.,** L. Giglio, M. J. Wooster, and L. A. Remer, Global characterization of biomass-burning patterns using satellite measurements of Fire Radiative Energy. *Remote Sens. Environ.*, 112, 2950-2962, 2008a.

Ichoku, C., J. V. Martins, Y. J. Kaufman, M. J. Wooster, P. H. Freeborn, W. M. Hao, Stephen Baker, C. A. Ryan, and B. L. Nordgren, Laboratory investigation of fire radiative energy and smoke aerosol emissions. *J. Geophys. Res.*, 113, D14S09, doi:10.1029/2007JD009659, 2008b.

Jordan N., **C. Ichoku**, and R. Hoff, Estimating Smoke Emissions Over The U.S. Southern Great Plains Using MODIS Fire Radiative Power and Aerosol Observations, *Atmos. Env.*, 42, 2007–2022, 2008.

Freeborn, P. H., M. J. Wooster, W. M. Hao, C. A. Ryan, B. L. Nordgren, S. P. Baker, and **C. Ichoku**, Relationships between energy release, fuel mass loss, and trace gas and aerosol emissions during laboratory biomass fires, J. Geophys. Res., 113, D01301, doi:10.1029/2007JD008679, 2008.

Castanho A., R. Prinn, V. Martins, M. Herold, **C. Ichoku**, and L. T. Molina, Urban Visible/SWIR surface reflectance ratios from satellite and sun photometer measurements in Mexico City, *Atmos. Chem. Phys*., 7, 5467-5477, 2007.

Kaufman, Y. J., L. A. Remer, D. Tanre, R.-R. Li, R. Kleidman, S. Mattoo, R. Levy, T. Eck, B. N. Holben, **C. Ichoku**, J. Martins, and I. Koren, 2005: A critical examination of the residual cloud contamination and diurnal sampling effects on MODIS estimates of aerosol over ocean. *IEEE Trans. Geosci. Rem. Sensing*, Vol. 43, No. 12, December 2005.

Ichoku, C. and Y. J. Kaufman, A method to derive smoke emission rates from MODIS fire radiative energy measurements, *IEEE Trans. Geosci. Rem. Sensing*, 43(11), 2636-2649, 2005.

Ichoku, C., L. A. Remer, and T. F. Eck, Quantitative evaluation and intercomparison of morning and afternoon Moderate Resolution Imaging Spectroradiometer (MODIS) aerosol measurements from Terra and Aqua, *J. Geophys. Res*., **110**, D10S03, doi:10.1029/2004JD004987, 2005.

Remer, L. A., Y. J. Kaufman, D. Tanre, S. Mattoo, D. A. Chu, J. V. Martins, R. R. Li, **C. Ichoku**, R. C. Levy, R. G. Kleidman, T. F. Eck, E. Vermote, and B. N. Holben, The MODIS aerosol algorithm, products and validation. *J. Atmos. Sci.*, **62**, 947-973, 2005.

Ichoku, C., Y. J. Kaufman, L. A. Remer, and R. Levy, 2004: Global aerosol remote sensing from MODIS. *Adv. Space Res.*, **34**, 820-827, 2004.

Ichoku, C., L. A. Remer, Y. J. Kaufman, R. Levy, D. A. Chu, D. Tanre, and B. N. Holben, MODIS Observation of Aerosols and Estimation of Aerosol Radiative Forcing Over Southern Africa during SAFARI 2000, *J. Geophys. Res.,* **108**(D13), 8499, doi: 10.1029/2002JD002366, 2003.

Levy, R. C., L. A. Remer, D. Tanre, Y. J. Kaufman, **C. Ichoku**, B. N. Holben, J. M. Livingston, P. B. Russell, and H. Maring, Evaluation of the Moderate Resolution Imaging Spectroradiometer (MODIS) retrievals of dust aerosol over the ocean during PRIDE. *J. Geophys. Res*., **108**(D19), 8594, doi: 10.1029/2002JD002460, 2003**.**

Ichoku, C., Y. J. Kaufman, L. Giglio, Z. Li, R. H. Fraser, J.-Z. Jin, And W. M. Park, Comparative analysis of daytime fire detection algorithms, using AVHRR data for the 1995 fire season in Canada: Perspective for MODIS, *Int. J. Rem. Sensing*, **24**(8) 1669-1690, 2003.

Kaufman, Y. J., **C. Ichoku**, L. Giglio, S. Korontzi, D. A. Chu, W. M. Hao, R.-R. Li, and C. O. Justice, Fires and smoke observed from the Earth Observing System MODIS instrument – products, validation, and operational use, *Int. J. Rem. Sensing*, **24**, 1765-1781, 2003**.**

Ichoku, C., R. Levy, Y. J. Kaufman, L. A. Remer, R.-R. Li, V. J. Martins, B. N. Holben, N. Abuhassan, I. Slutsker, T. F. Eck, and C. Pietras, Analysis of the performance characteristics of the five-channel Microtops II sun photometer for measuring aerosol optical thickness and precipitable water vapor. *J. Geophys. Res*., **107**(D13), doi: 10.1029/2001JD001302, 2002.

Chu, D. A., Y. J. Kaufman, **C. Ichoku**, L. A. Remer, D. Tanré, and B. N Holben, Validation of MODIS aerosol optical depth retrieval over land., *Geophys. Res. Lett.*, 10.1029/2001GL013205, 29 June 2002.

Ichoku, C., D.A. Chu, S. Mattoo, Y.J. Kaufman, L.A. Remer, D. Tanré, I. Slutsker, and B. Holben, A spatio-temporal approach for global validation and analysis of MODIS aerosol products. *Geophys. Res. Lett*., 10.1029/2001GL013206, 29 June 2002.

Remer, L. A., D. Tanré, Y. J. Kaufman, **C. Ichoku**, S. Mattoo, R. Levy, D. A. Chu, B. N. Holben, O. Dubovik, Z. Ahmad, A. Smirnov, J. V. Martins, and R.-R. Li, Validation of MODIS Aerosol Retrieval Over Ocean, *Geophys. Res. Lett.*, 10.1029/2001GL013204, 29 June 2002.

Karnieli, A., A. Gabai, **C. Ichoku**, E. Zaady and M. Shachak, Temporal dynamics of soil and vegetation spectral responses in a semi-arid environment, *Int. J. Rem. Sensing*, **23**(19), 4073–4087, 2002.

Andreae T. W., Andreae M. O., **Ichoku C.**, Maenhaut W., Cafmeyer J., Karnieli A., and Orlovsky L., Light Scattering by Dust and Anthropogenic Aerosol at a Remote Site in the Negev Desert, Israel. *J. Geophys. Res.*, Vol. 107, No. D2, pp. AAC1-1 – AAC1-18 , January 16, 2002.

Sabbah I., **Ichoku C.**, Kaufman Y. J., Remer, L., Full year cycle of desert dust spectral optical thickness and precipitable water vapor over Alexandria, Egypt, *J. Geophys. Res.*, **106**(D16) , pp. 18,305-18,316, 2001.

Formenti P., Andreae M. O., Andreae T. W., **Ichoku C.**, Schebeske G., Kettle J., Maenhaut W., Cafmeyer J., Ptasinsky J., Karnieli A., and Lelieveld J., Physical and chemical characteristics of aerosols over the Negev Desert (Israel) during summer 1996. *J. Geophys. Res.*, **106**(D5), 4871-4890, 2001.

Ichoku C., Andreae M. O., Andreae T. W., Meixner F. X., Schebeske G., Formenti P., Maenhaut W., Cafmeyer J., Ptasinski J., Karnieli A., and Orlovsky L., Interrelationships Between Aerosol Characteristics and Light Scattering During Late Winter in an Eastern Mediterranean Arid Environment. *J. Geophys. Res.*, **104**(D20), 24371-24393, 1999.

Arkin Y., **Ichoku C**., and Karnieli A., Fault Traces in the Arid Arava Valley Floor, Israel, Revealed by RADARSAT Surface Roughness Classification. *Canadian J. Rem. Sensing,* **25**(3), 302-310, 1999.

Ichoku C., Karnieli A., Arkin Y., Chorowicz J., Fleury T., and Rudant J.-P. Exploring the Utility Potential of SAR Interferometric Coherence Images. *Int. J. of Rem. Sensing*, **19**(6), 1147-1160, 1998.

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Conference Presentations:

Invited Talk: **Ichoku**, Satellite fire characterization and smoke emissions, *Joint NASA/USDA Forest Service Wildfire Recovery Initiative Workshop*, Pasadena, CA, 28-29 November 2007.

Invited Talk: **Ichoku et al.**, Effective utilization of satellite measurements for mitigating the impacts of wildfire disasters on regional air-quality, *International Symposium on Remote Sensing of Environment (ISRSE)*, San José, Costa Rica, 25 – 29 June 2007.

Invited Talk: **Ichoku**, Satellite monitoring of fires and smoke over Africa, *6th African Association of Remote Sensing of the Environment (AARSE) Conference*, Cairo, Egypt, 30 Oct – 2 Nov, 2006

Invited Talk: **Ichoku**, Improving smoke source characterization in chemical transport models by introducing satellite measurements of fire radiative energy, *5th AEROCOM Workshop*, Virginia Beach, 17-19 Oct 2006.

Talk: **Ichoku** and Kaufman, Monitoring the strengths of fires and smoke emission from space to include wildfire impacts in air-quality forecasting, *2006 National Air Quality Conferences*, San Antonio, TX, February 5-8, 2006.

Talk: **Ichoku** and Kaufman, Improving regional smoke emission estimates with satellite-based fire radiative energy (FRE) measurement, *GEIA-ACCENT Workshop on Biomass Burning and Satellite Observations*, Toulouse, France, 14-15 December 2005.

Invited Talk: **Ichoku** and Kaufman, Active monitoring of fire intensity and smoke pollution from satellites, *IGARSS'2005 Symposium*, Seoul, Korea, 25-29 July 2005.

Talk: **Ichoku** and Kaufman, Satellite-based assessment of aerosol loading and transport over West Africa, *EGU General Assembly*, Vienna, Austria, 25-29 April 2005.

Poster: **Ichoku** and Kaufman, Estimation of fire emissions from satellite-based measurements, *AGU'2004 Fall Mtg*, San Francisco, CA, December 13-17, 2004.

Invited Talk: **Ichoku et al**., Application of MODIS-derived active fire radiative energy to fire disaster and smoke pollution monitoring, *IGARSS'2004 Symposium*, Anchorage, AK, 20-24 September 2004.

Invited Talk: **Ichoku** and Kaufman, Estimation of Fire Emissions from Satellite Measurements, *Joint NASA/EPA Workshop on Air Quality*, Research Triangle Park, NC, 14-16 September 2004.

Poster : Ichoku et al., MODIS aerosol distribution and climate forcing calculations, *Gordon Research Conference*, New London, NH, July 13-18, 2003.

Poster : Ichoku et al., Synergism of MODIS aerosol remote sensing from Terra and Aqua, *EGS-AGU-EUG Joint Assembly*, Nice, France, 06 - 11 April 2003.

Invited Talk: Ichoku et al., Global Aerosol Remote Sensing from MODIS, *COSPAR World Space Congress*, Houston, TX, 10-19 October 2002.

Invited Talk: Ichoku et al., MODIS aerosol products: quality assessment and regional application case studies …, *IGARSS'2002 Symposium*, Toronto, Canada, 24-28 June 2002.

Poster: Ichoku et al., MODIS observation of aerosols over Southern Africa during SAFARI 2000: data, validation, radiative forcing, *AGU'2001 Fall Mtg*, San Francisco, CA, December 10-14, 2001.

Invited Talk: Ichoku et al., Techniques of Global Validation of Aerosol Retrievals from MODIS, *IGARSS'2001 Symposium*, Sydney, Australia, 09-13 July 2001.

Poster: Ichoku et al., Comparative analysis of daytime fire detection algorithms, using AVHRR data …, *EARSeL Symposium and Workshop 2001***,** Marne-la-Vallee, Paris, France, 13-18 May 2001

Invited Talk: Ichoku et al., Detection and Monitoring of Wildfires by MODIS on the Terra and Aqua Satellites, *DOE Fire Safety Workshop 2001*, Augusta, Georgia, April 24-26, 2001.

Seminars:

Invited Seminar: AOSC/Univ. of MD: "Satellite-based smoke emissions estimation from fire radiative energy measurements", 23-February-2007.

Invited Seminar: ESSIC/Univ. of MD: "Toward an improved global characterization of atmospheric aerosols", 23-January-2006.

Invited Seminar: NASA/GSFC AeroCenter Forum: "Potential of improving smoke source characterization with satellite fire radiative power measurements", 27-September-2005.

Invited Seminar: NASA/GSFC Laboratory for Atmospheres: "Quality-control strategies in aerosol remote sensing from MODIS", 17-July-2002.

Invited Seminar: NASA/GSFC Climate & Radiation Branch: "MODIS aerosol products and climate research", 5-June-2002.

Public Lectures:

Invited Lecture: "How wildfires affect us all far and near", Guest Scientist Lecture aboard the Explorer of the Seas, Caribbean, 10 August 2007.

Invited Lecture: **Ichoku**, MODIS Atmosphere Parameters Subset Statistics (MAPSS), *MODIS Data Workshop*, Univ. of Maryland, Baltimore County, 10-January-2007.